

WHAT IS CLAIMED IS:

1. A method for dissolving a secondary fluid in a primary fluid, using an in-line mixing device, the method comprising:

flowing a pressurized primary fluid through a first section of the mixing device which is configured to increase the

5 pressure/velocity of the primary fluid flow;

discharging the increased-pressure primary fluid from the first section into a second section having a larger cross-sectional area than said first section;

10 introducing a secondary fluid in the vicinity of a discharge area where the primary fluid is discharged from the first section, the secondary fluid being introduced in substantially the same direction as the direction of primary fluid flow;

mixing the primary fluid and the secondary fluid downstream of said discharge area; and

15 passing the mixed primary and secondary fluids through a conduit over a predetermined distance which is substantially greater than a largest cross-sectional dimension of said conduit for causing said secondary fluid to be so dissolved in said primary fluid substantially to its saturation point.

2. The method of dissolving according to claim 1, wherein said conduit has a length which is between about one foot and about 50 feet.

3. The method of dissolving according to claim 1, wherein said conduit has a length which is between one foot and 30 feet.

4. The method of dissolving according to claim 1, wherein said conduit has a length which is between one foot and 10 feet.

5. The method of dissolving according to claim 1, wherein said primary fluid is a liquid and said secondary fluid is a gas.

6. The method of dissolving according to claim 5, wherein said liquid is water based, and said gas is air.

7. A method for mixing a secondary fluid in a primary fluid, using an in-line mixing device, the method comprising:

flowing a pressurized primary fluid through a first section of the mixing device which is configured to increase the

5 pressure/velocity of the primary fluid flow;

discharging the increased-pressure primary fluid from the first section into a second section having a larger cross-sectional area than said first section;

10 introducing a secondary fluid in the vicinity of a discharge area where the primary fluid is discharged from the first section, the secondary fluid being introduced in substantially the same direction as the direction of primary fluid flow;

mixing the primary fluid and the secondary fluid downstream of said discharge area; and

15        passing the mixed primary and secondary fluids through a conduit over a predetermined distance which is substantially greater than a largest cross-sectional dimension of said conduit for causing said secondary fluid to be so dissolved in said primary fluid substantially to its saturation point.

8.    The method of mixing according to claim 7, wherein said conduit has a length which is between one foot and 50 feet.

9.    The method of mixing according to claim 7, wherein said conduit has a length which is between one foot and 30 feet.

10.   The method of mixing according to claim 7, wherein said conduit has a length which is between one foot and 10 feet.

11.   The method of mixing according to claim 7, wherein said primary fluid is a liquid and said secondary fluid is a gas.

12.   The method of mixing according to claim 11, wherein said liquid is water based, and said gas is air.